

NORTHERN CALIFORNIA GEOLOGICAL SOCIETY



NCGS DINNER IN COMMEMORATION OF 1906 EARTHQUAKE CENTENNIAL

The 1906 Earthquake – Lessons Learned, Lessons Forgotten, and Looking Forward

Wednesday March 29, 2006

Speaker: **Dr. Mary Lou Zoback**, U.S. Geological Survey, Menlo Park

6:00 pm at Orinda Masonic Center

(Reservations are required by March 22, 2006)

Stepping out of our normal routine, the **Northern California Geological Society** is pleased to announce this *special dinner and evening* with **Dr. May Lou Zoback**. Come listen to Dr. Zoback wax eloquent on the lessons the 1906 earthquake has provided us and what it may mean for the future. For this special event, planned for our normal monthly meeting date, but **starting one-half hour early**, we are planning in typical NCGS style, a delicious entrée of **Teriyaki sesame chicken**, with garden and Caesar salads, rice pilaf, rolls & butter, and cheese ravioli with a vegetarian marinara sauce. For vegetarian dinners **Eggplant Parmesan** will be served in place of the Teriyaki Chicken. Early reports are that we may be serving wines from **Rosenblum Cellars** of Alameda. Please note that a vegetarian option is only available if notified ahead (see attached form).

Abstract: The 1906 Earthquake – Lessons Learned, Lessons Forgotten, and Looking Forward

The 1906 Mw7.8 earthquake on the N. San Andreas Fault marked the birth of modern earthquake science. For the first time, the effects and impacts of a major seismic event were systematically investigated and documented. The resulting publication, the so-called “Lawson report” (named for the principal investigator), contained many “firsts”:

- the entire 300-km-long surface rupture was mapped, surface offsets documented, and co-seismic surface displacements inferred from geodetic measurements
- analysis of local seismic data yielded an epicenter ~40 km NW of the current best location offshore from San Francisco - impressive considering how little was known of local velocity structure and that P and S waves had only been identified by seismologists <10 yrs before
- comprehensive mapping of intensity showed the strongest shaking occurred in areas of “made land” (fill) and soft sediment including China Basin and present day Marina district—two San Francisco neighborhoods heavily damaged again in 1989
- surveys of damage to structures showed destruction was closely related to building design and construction--a painful lesson oft repeated around the world
- interpretation of the pre-and co-seismic deformation patterns led Henry Reid to propose the elastic rebound hypothesis--that earthquakes represent sudden release of elastic energy along a fault resulting from a cycle of slow strain accumulation produced by relative displacements of neighboring portions of the crust. It is still accepted today with minor modifications, even though the basis for large-scale horizontal displacements wasn't established until the plate tectonic revolution five decades later.

As earthquake science evolves, reanalysis of the 1906 earthquake data continues to yield new insights about that event and the behavior of large strike-slip faults in general. A ~60 yr period of seismic quiescence in N. California after 1906 remains the best example of a regional “stress shadow” resulting from reduction of stress on adjacent subparallel faults by slip in a major earthquake. Looking to the future, a dense array of continuous GPS recorders in N. California, part of EarthScope’s Plate Boundary Observatory, can search for fault interactions and determine if an acceleration of strain rate precedes the next big earthquake as it may have prior to 1906.

Biography:

Dr. Zoback is a Research Geophysicist at the U. S. Geological Survey, Menlo Park, CA. She received her B.S. in 1974, an M.S. in 1975, and Ph.D., 1978. All degrees are in Geophysics and all were received from Stanford University. She held a National Research Council Post-Doctorate in 1978-1979 with the USGS Heat Flow Studies group, and has been a research scientist in the Earthquake Studies office at the USGS since 1979, and is currently in the Seismology Branch.

Her major area of interest is active tectonics, with emphasis on the relationship of the in-situ tectonic stress field to earthquake deformation. Regions of interest range from the Basin and Range province, the San Andreas fault system, and intraplate regions. She was Leader of the World Stress Map Project of the International Lithosphere Program (1986-1992). This project involved more than 40 scientists from over 30 different countries with the objective of compiling and interpreting geologic and geophysical data on the present day tectonic stress field to infer the relative magnitudes of the different forces acting on the lithosphere. She was also the Lead to a special issue of JGR in July 1992.

She is a past member of U. S. Geodynamics Committee (National Research Council); Editorial Board, GEOLOGY; NSF review panel for the Continental Dynamics program; and National Research Council Panel on Coupled Hydrologic/Tectonic/Hydrothermal Systems at Yucca Mountain. She is also a past member of Geological Society of America Council and Executive Board; past-President, GSA Cordilleran Section; past-Chair, GSA Geophysics Division. Her honors include: AGU Macelwane Award (1987), Elected National Academy of Sciences (1995), USGS Gilbert Fellowship Award for a one year sabbatical in Karlsruhe, Germany (1990-1991), Fellow, GSA (1984), Fellow, AGU (1987).

***** **Dinner Logistics** *****

Meeting Details: Social Hour: 6:00 – 7:00 pm; Dinner: 7:00 – 8:00 pm Presentation: 8:00 – open

Time: March 29, 2006, 6:00 pm, Orinda Masonic Center 9 Altarinda Road, Orinda, CA.

Cost: \$20/person

***** **REGISTRATION FORM (Dr. Mary Lou Zoback Dinner)** *****

Name: _____ E-mail: _____

Address: _____ Phone (day): _____ Phone (evening): _____

Dinner: Regular: _____ Vegetarian: _____ (Please check one) Check Amount: _____

Please mail a check made out to **NCGS** to: **Tridib Guha**
5016 Gloucester Lane,
Martinez, CA 94553

Questions: e-mail: tridibguha@sbcglobal.net Phone: (925) 370-0685 (evening - PREFERRED) (925) 363-1999 (day – emergency)